Commonwealth of Kentucky
Department for Medicaid Services
Division of Program Quality and Outcomes

Focused Study: Prenatal Smoking

FINAL REPORT
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Introduction

Smoking has been reported to be among the most prevalent, modifiable causes of adverse pregnancy outcomes, with increased prevalence associated with low socioeconomic status (American College of Obstetricians and Gynecologists [ACOG], 2010; Institute of Medicine [IOM], 2007). It has been estimated that 5–8% of preterm births and 13–19% of low-birthweight-term deliveries can be attributed to maternal smoking (ACOG, 2010).

Prenatal smoking is associated with more than double the risk for delivering a small-for-gestational-age (SGA) baby (Aliyu et al., 2011), with the greatest risk among women who smoke throughout the duration of pregnancy (Blatt et al., 2015). SGA (a.k.a., fetal growth-restriction; March of Dimes, 2015) is a medical indication for preterm delivery (ACOG, 2013) and prenatal smoking has been shown to increase the risk for medically indicated preterm delivery (Melville, 2010). SGA and preterm delivery are the most prevalent medical/obstetric complications among smokers (Aliyu et al., 2011), and are the primary drivers of low birthweight delivery outcomes (March of Dimes, 2014). Increased risk for the adverse perinatal outcomes of placental abruption, placenta previa, stillbirth (Aliyu et al., 2011) and spontaneous abortion (Pineles et al., 2014) has also been reported.

According to the Kentucky Department of Public Health (KDPH), among Kentucky women who smoked during pregnancy had twice the odds for delivering a low-birthweight baby compared to nonsmokers, and 25% higher odds for preterm delivery (KDPH, 2013). Historically, Kentucky had the second highest rate of prenatal smoking in the U.S. (KDPH, 2013). Using administrative claims data, the Island Peer Review Organization (IPRO)/Kentucky Department of Medicaid Services (KDMS) Postpartum Readmission Study found a 20.3% smoking prevalence rate among Medicaid managed care (MMC) enrollees who delivered during the period of 11/6/2011–9/5/2012 (IPRO/KDMS, 2014). This finding is similar to the 22.9% smoking prevalence rate among all women in Kentucky who delivered in 2011, according to a vital records study (KDPH, 2013). It is anticipated that the findings of this study—which will evaluate the relationships of prenatal smoking status, receipt of cessation services, managed care organization (MCO) membership, prenatal visits, and demographic characteristics with the outcomes of prenatal SGA and SGA-indicated preterm birth—will inform knowledge about susceptible subpopulations and opportunities to improve birth outcomes among the Kentucky MMC population.

The Affordable Care Act (ACA) requires Medicaid coverage for counseling and pharmacotherapy for cessation of tobacco use by pregnant women, in accordance with the Public Health Service (PHS) Guidelines. The U.S. Preventive Services Task Force (USPSTF, 2015) recommends clinicians ask all pregnant women about tobacco use, citing strong evidence that augmented, pregnancy-tailored counseling is of benefit for pregnant women who smoke. The PHS guidelines recommend that all identified pregnant smokers be offered person-to-person counseling beyond the minimal advice to quit, as well as case-by-case evaluation for pharmacotherapy; the latter is not universally recommended due to limited data on safety and effectiveness (Centers for Medicare and Medicaid Services [CMS], 2011; USPSTF, 2015). Further, ACOG (2010) recommends the following set of interventions, sometimes referred to as "the 5 A's," for smoking cessation during pregnancy: (1) Ask about tobacco use; (2) Advise to quit; (3) Assess willingness to make a quit attempt; (4) Assist in quit attempt; and (5) Arrange follow-up. Yet, a recent study found inconsistent adherence to the 5 A's. For example, only 25% of providers surveyed asked about tobacco use at the initial visit, if they suspected that pregnant patients were smoking, even though smoking was not indicated on the intake form (Coleman-Cowger et al., 2014).

Since smoking cessation at any point during pregnancy provides benefit, ACOG advocates that providers encourage persistent smokers to quit at every visit and review prevention strategies in the third trimester for smokers who have already quit to help ensure continued abstinence. (ACOG, 2010) Assessing receipt of these guideline-recommended interventions among the general prenatal MMC population would help to identify gaps in service provision and highlight specific opportunities for actionable improvements.

Study Aims

The aims of the proposed focused study are:

1. assess smoking prevalence, member characteristics, and receipt of prenatal smoking cessation services among the Kentucky MMC population who delivered a singleton live or non-live birth;
2. for the identified smoker subpopulation, evaluate the relationships between smoking cessation benefit utilization and demographic, clinical and health care access characteristics;
3. identify clinical, demographic and smoking-related factors that impact selected adverse perinatal outcomes; and
4. profile provider prenatal and postpartum interventions relative to guidelines, including the 5 A's, MCO care coordination and case management of prenatal and postpartum interventions, whether or not smoking abstinence was achieved and, if it was achieved, whether it was achieved during the prenatal period or the postpartum period.

Methodology

Two types of investigations were utilized: an administrative study using claims data to identify associations related to receipt of cessation services and outcomes and a chart review study to investigate in more depth the smoking cessation interventions that were used and their impact on improving smoking-related outcomes.

Administrative Study

The administrative eligible population included the entire MMC population of members who delivered a singleton live or non-live birth (excluding induced abortions) during the period of June 1, 2014–May 31, 2015, with continuous enrollment from 43 days prior to delivery through 56 days after delivery (aligned with the Healthcare Effectiveness Data and Information Set [HEDIS®] criteria for the Prenatal and Postpartum Care measure). Preliminary examination of the eligible population did not show a significant association between smoking and spontaneous abortion, which occurs at less than 20 weeks gestation. To include members of comparable prenatal duration, and as a result, with similar time frame for opportunity for receipt of smoking cessation benefits, the International Classification of Diseases, Revision 9 (ICD-9) code for spontaneous abortion was used as a proxy for gestational age of < 20 weeks, and these members were excluded from the analytic sample. Administrative claims/encounter data were used to evaluate the study associations described in the **Study Aims** section among the administrative analytic sample. To accomplish this analysis, *chi*-squared analysis and multiple logistic regression were used. The same ICD-9 codes to define smoking status were used as those in the IPRO/KDMS Postpartum Hospital Readmission Study (2014) across all care settings during the 280 days prior to and including the delivery date (i.e., the expected prenatal period for a term pregnancy). Claims data identified smokers using codes for smoking diagnosis, smoking cessation pharmaceutical claims and smoking cessation counseling claims for this same time period. ICD-9 codes were also used to define perinatal outcomes and clinical risk factors.

Chart Review – Sample Selection

A random sample of 500 members was selected from the eligible population, stratified by MCO and smoking status per ICD-9 diagnosis codes. The selected sample size of 500 had sufficient power to yield a significant proportion estimate, as would subsamples as small as 30. The identified sample included 100 records per MCO, each consisting of 50 identified smokers and 50 nonsmokers per administrative data.

For each member in the chart review sample, MCOs were asked to submit a copy of the provider prenatal and postpartum outpatient care records, as well as the complete care coordination/case management record, including all documentation for prenatal, delivery inpatient, and postpartum care coordination.

Data Collection Methodology

In order to standardize the abstraction process, a medical record review tool and detailed instructions for each element, including requirements for indicator compliance, clear definitions for elements and likely location of the elements in the medical records were developed by IPRO in collaboration with KDMS. An electronic tool was created in Microsoft Access, with training provided for IPRO nurse reviewers. Each nurse reviewer achieved greater than 95% accuracy on test charts prior to chart abstraction. Inter-rater reliability (IRR) testing was conducted to evaluate the performance of the nurse reviewers at the outset, and regular oversight was conducted throughout the review process through weekly over-reads of a minimum of 5% of reviewed charts. All nurse abstractor reviewers maintained a performance of at least 95% accuracy throughout the oversight process. The cumulative abstraction accuracy rate for the over-read was 98%.

Abstraction Process

Using the standardized tool that was developed, nurse reviewers abstracted the information contained in provider medical records and MCO case management records related to smoking cessation interventions, including the 5 A's, from provider prenatal and postpartum outpatient visit charts, care coordination and case management prenatal and postpartum interventions for smoking cessation referrals and both prenatal and postpartum smoking abstinence outcomes.

Results

Administrative Study Findings for the Eligible Population

There were a total of 26,002 MMC enrollees who delivered a singleton live or non-live birth, or had a spontaneous abortion (excluding induced abortions), from June 1, 2014 to May 31, 2015, continuously enrolled from 43 days prior through 56 days after delivery. Smoking prevalence, as identified by either ICD-9 codes for smoking or smoking cessation benefit claims, was 30.83% (8,017/26,002).

Factors Associated with Smoking Status

Table 1 presents population demographic and clinical characteristics, as well as access-related factors, by smoking status. Demographic, clinical and access-related factors were significantly associated with smoking status. The make-up of the population of mothers who smoke and their access to prenatal care are summarized as follows:

Age and Gender

- Most (79.68%) of the study population were aged 20–34 years; 13.31% were aged 11–19 years (adolescents), 6.73% were aged 35–44 years; and less than 1% were aged 45–64 years.
- Most (83.65%) smokers were aged 20–34 years, followed by adolescents (9.63%). The age group with the greatest proportion of smokers was the oldest age group, i.e., 34.25% of women aged 45–64 years, followed by women aged 20–34 years (32.37%). Among adolescents aged 11–19 years, 22.31% were identified as smokers.

Race/Ethnicity

- Race and ethnicity were difficult to identify using administrative data. Most (76.71%) of the study population were of "Other" race/ethnicity and 7.49% had no race/ethnicity provided; 12.14 % were white and 3.42% black. Given the high proportion of members for whom race/ethnicity could not be determined, this factor was not included in any further analysis.

Geographic Area of Residence

- Non-Appalachian-urban residing members comprised the largest proportion of the study population (49.88%), followed by Appalachian (32.50%), non-Appalachian-rural (17.48%), and unknown county of residence (< 1%). Most (46.95%) smokers resided in non-Appalachian urban counties, followed by Appalachian counties (35.01%).

Clinical Characteristics

- Less than 1% of the study population had a diagnosis of alcohol abuse; however, 75% of women with a diagnosis of alcohol abuse were identified as smokers.
- Smoking was also prevalent among women with a diagnosis of drug abuse. Although only 5.78% of the study population had a diagnosis of drug abuse, 73.25% of this subgroup was identified as smokers.
- Women with a diagnosis of depression comprised 8.88% of the study population, and 48.87% of these women were smokers.
- Women with a diagnosis of asthma/chronic obstructive pulmonary disease (COPD) comprised 11.19% of the study population, and 44.74% of women with this diagnosis were identified as smokers.
- Women with a diagnosis of obesity comprised 12.66% of the study population, and 32.54% of this subgroup were smokers.

Access to Care

- MCO and smoking status:
  - WellCare of Kentucky enrollees comprised the largest proportion of the study population (36.23%) and Anthem Blue Cross Blue Shield (BCBS) Medicaid enrollees the smallest (4.73%). It should be noted that Anthem BCBS first began enrolling members in 2014, and this would have affected the proportion of Anthem BCBS Medicaid members eligible to be included in the study population.
  - The MCO with the greatest proportion of smokers was WellCare of Kentucky (32.83%) followed by Aetna Better Health of Kentucky (31.89%). The MCO with the smallest proportion of smokers was Humana-CareSource (26.88%).
- Any primary care provider (PCP)/obstetrician outpatient visit, 280 days prior to delivery:

- Administrative data were evaluated for evidence of prenatal care. More than one-third of the members (34.66%) had no administrative claim for a prenatal PCP/obstetrician outpatient visit. This result may have been affected by global maternity billing in which a provider is paid one fee for the entire maternity episode and may not always submit each detailed prenatal visit, and the eligible population included members with spontaneous abortions, who may not have had opportunity for a prenatal visit. Therefore, prenatal visits may not be reliably measured by administrative data.

- Insufficient prenatal care:
  - Less than one-tenth of members (8.56%) had a diagnosis code signifying supervision of high-risk pregnancy with insufficient prenatal care (ICD-9 code V 23.7). The proportion of smokers among women with this diagnosis code for insufficient prenatal care (47.57%) was higher compared to the proportion of members without this diagnosis code (29.26%). It should be noted that it is not known how the code for insufficient prenatal care is used among Kentucky MMC providers, and it is not possible to determine to what extent adequate prenatal care is lacking when this code is used.
- Prenatal smoking cessation benefit received:
  - Most smokers had no administrative claims for any smoking cessation benefit (89.32%), and only a few smokers received medication cessation benefits, but no counseling cessation benefits (5.91%). Overall, 4.38% of smokers received only counseling cessation benefits, and < 1% received both medication and counseling cessation benefits.

Table 1: Eligible Population Characteristics

Eligible Population Characteristics	Smoker[a] # (Row %) (Column %)	Nonsmoker[a] # (Row %) (Column %)
Eligible population: 26,002 (100%)[b]	8,017 (30.83%)	17,985 (69.17%)
Demographic characteristics		
Age group[c]		
11–19 years (n = 3,460; 13.31%)	772 (22.31%) (9.63%)	2,688 (77.69%) (14.95%)
20–34 years (n = 20,719; 79.68%)	6,706 (32.37%) (83.65%)	14,013 (67.63%) (77.91%)
35–44 years (n = 1,750; 6.73%)	514 (29.37%) (6.41%)	1,236 (70.63%) (6.87%)
45–64 years (n = 73; 0.28%)	25 (34.25%) (0.31%)	48 (65.75%) (0.27%)
Race/Ethnicity[c]		
Asian/Pacific Islander (n = 63; 0.24%)	2 (3.17%) (0.02%)	61 (96.83%) (0.34%)
Black (n = 888; 3.42%)	215 (24.21%) (2.68%)	673 (75.79%) (3.74%)
White (n = 3,157; 12.14%)	1,063 (33.67%) (13.26%)	2,094 (66.33%) (11.64%)
Other (n = 19,946; 76.71%)	6,108 (30.62%) (76.19%)	13,838 (69.38%) (76.94%)
Not provided (n = 1,948; 7.49%)	629 (32.29%) (7.85%)	1,319 (67.71%) (7.33%)
Geographic area of residence[c]		
Appalachian (n = 8451; 32.50%)	2,807 (33.22%) (35.01%)	5,644 (66.78%) (31.38%)
Non-Appalachian, rural (n = 4,546; 17.48%)	1,436 (31.59%) (17.91%)	3,110 (68.41%) (17.29%)
Non-Appalachian, urban (n = 12,971; 49.88%)	3,764 (29.02%) (46.95%)	9,207 (70.98%) (51.19%)
Unknown (n = 34; 0.13%)	10 (29.41%) (0.12%)	24 (70.59%) (0.13%)
Clinical characteristics[c]		
COPD (includes asthma; n = 2,910; 11.19%)	1,302 (44.74%) (16.24%)	1,608 (55.26%) (8.94%)
Depression (n = 2,310; 8.88%)	1,129 (48.87%) (14.08%)	1,181 (51.13%) (6.57%)
Drug abuse (n = 1,503; 5.78%)	1,101 (73.25%) (13.73)	402 (26.75%) (2.24%)
Alcohol abuse (n = 192; 0.74%)	144 (75.00%) (1.80%)	48 (25.00%) (0.27%)
Obesity (n = 3,291; 12.66%)	1,071 (32.54%) (13.36%)	2,220 (67.46%) (12.34%)
Access-related factors		
MCO at time of delivery[c]		
WellCare of Kentucky (n = 9,420; 36.23%)	3,093 (32.83%) (38.58%)	6,327 (67.17%) (35.18%)
Passport Health Plan (n = 5,973; 22.97%)	1,687 (28.24%) (21.04%)	4,286 (71.76%) (23.83%)
Humana-CareSource (n = 1,968; 7.57%)	529 (26.88%) (6.60%)	1,439 (73.12%) (8.00%)
Aetna Better Health of Kentucky (n = 7,411;	2,363 (31.89%) (29.47%)	5,048 (68.11%) (28.07%)

Eligible Population Characteristics	Smoker[a] # (Row %) (Column %)	Nonsmoker[a] # (Row %) (Column %)
28.50%)		
Anthem BCBS Medicaid (n = 1,230; 4.73%)	345 (28.05%) (4.30%)	885 (71.95%) (4.92%)
Any PCP/obstetrician visit, 280 days prior to delivery[c]		
1 or more outpatient visits (n = 16,989; 65.34%)	5,532 (32.56%) (69.00%)	11,457 (67.44%) (63.70%)
0 outpatient visits (n = 9,013; 34.66 %)	2,485 (27.57%) (31.00%)	6,528 (72.43%) (36.30%)
Insufficient prenatal care (ICD-9 code V23.7, 280 days prior through delivery)[c]		
Yes (n = 2,226; 8.56%)	1,059 (47.57%) (13.21%)	1,167 (52.43%) (6.49%)
No (n = 23,776; 91.44%)	6,958 (29.26%) (86.79%)	16,818 (70.74%) (93.51%)
Prenatal smoking cessation benefit[d]		
None received	7,161 (100%) (89.32%)	N/A
Medication dispensed, only	474 (100%) (5.91%)	N/A
Counseling claim, only	351 (100%) (4.38%)	N/A
Both medication and counseling	31 (100%) (0.39%)	N/A

[a] Smokers were defined as members with ICD-9 code for smoking and/or claims for smoking cessation benefit. Nonsmokers were defined as members without ICD-9 code for smoking or any claims for smoking cessation benefit.
[b] MMC member population who delivered a singleton live or non-live birth (excluding induced abortions) during June 1, 2014-May 31, 2015, continuously enrolled from 43 days prior through 56 days after delivery.
[c] Shows statistically significant association with smoking status based upon *chi*-squared test statistic (*P*-value < 0.05).
[d] Based on smoking cessation medications dispensed and claims for smoking cessation counseling, both prior to delivery date. Evaluation of statistically significant associations with smoking status is not relevant, since smoking cessation benefits only apply to smokers, but not to nonsmokers.
COPD: chronic obstructive pulmonary disease; MCO: managed care organization; BCBS: Blue Cross Blue Shield; PCP: primary care provider; ICD: International Classification of Diseases; N/A: not applicable.

Administrative Study Findings for the Analytic Sample

Smoking Cessation Benefit Receipt Rates by Demographic and Clinical Characteristics, and Access-Related Factors

Table 2 presents demographic and clinical characteristics, as well as access-related factors, by smoking cessation benefit receipt during the prenatal period, among the smoker subpopulation of the administrative analytic sample (excludes members with induced or spontaneous abortions; n = 7,606).

The vast majority of smokers (n = 6,814, 89.59%) had neither a pharmaceutical smoking cessation claim nor a counseling smoking cessation claim. Overall, 4.30% (n = 327) of the smokers only had a counseling claim, while 5.72% (n = 435) only had a pharmaceutical claim. Very few smokers had a claim for both a pharmaceutical and counseling cessation benefit (n = 30; 0.39%). MCO membership at the time of delivery was not significantly associated with receipt of smoking cessation benefit. However, a significant association was evident between smoking cessation benefit receipt and insufficient prenatal care. Notable findings are summarized as follows:

Demographic Characteristic Rates for Receipt of Smoking Cessation Benefits

- Among smokers aged 11–19 years, 92.38% had no claims for cessation benefits, a higher percentage compared to older age groups. Compared to members residing in non-urban areas, a greater proportion of women residing in urban areas had no claims for prenatal smoking cessation benefits (91.72%).

Clinical Characteristic Rates for Receipt of Smoking Cessation Benefits

- Smokers with COPD had a lower rate of receiving neither pharmaceutical nor counseling smoking cessation benefits compared to smokers without COPD (85.96% and 89.76%, respectively).
- Fewer smokers with depression received neither pharmaceutical nor counseling smoking cessation benefits compared to smokers without depression (77.47% and 91.51%, respectively).
- Fewer smokers with a diagnosis of drug abuse received neither pharmaceutical nor counseling smoking cessation benefits compared to smokers without a diagnosis of drug abuse (87.04% and 90.01%, respectively).

- Fewer smokers with a diagnosis of alcohol abuse received neither pharmaceutical nor counseling smoking cessation benefits compared to smokers without alcohol abuse. (68.89% and 89.96%, respectively).

Access-Related Factor Rates for Receipt of Smoking Cessation Benefits

- The proportion of members with a claim for smoking cessation benefits did not differ by MCO of enrollment at the time of delivery.
- A large proportion of members both with and without a diagnosis code for insufficient prenatal care did not receive pharmaceutical nor counseling smoking cessation benefits (92.03% and 89.19%, respectively).

Table 2: Analytic Subsample of Smokers: Smoking Cessation Benefit Receipt Rates

Smoker Subpopulation (n = 7,606)[a]	Only Pharmaceutical Cessation Benefit Claim (n = 435; 5.72%) # (Row %)	Only Cessation Counseling Benefit Claim (n = 327; 4.30%) # (Row %)	Both Types of Cessation Benefit Claims (n = 30; 0.39%) # (Row %)	Neither Type of Cessation Benefit Claims (n = 6,814; 89.59%) # (Row %)
Demographic characteristics				
Age group[b]				
11–19 years (722; 9.49%)	28 (3.88%)	25 (3.46%)	2 (0.28%)	667 (92.38%)
20–34 years (6,384; 83.93%)	351 (5.50%)	276 (4.32%)	21 (0.33%)	5,736 (89.85%)
35–44 years (477; 6.27%)	52 (10.90%)	25 (5.24%)	7 (1.47%)	393 (82.39%)
45–64 years (23; 0.30%)	4 (17.39%)	1 (4.35%)	0	18 (78.26%)
Geographic area of residence[b]				
Appalachian (2,690; 35.37%)	150 (5.58%)	123 (4.57%)	9 (0.33%)	2,408 (89.52%)
Non-Appalachian – rural (1,381; 18.16%)	105 (7.60%)	107 (7.75%)	5 (0.36%)	1,164 (84.29%)
Non-Appalachian – urban (3,526; 46.36%)	180 (5.10%)	96 (2.72%)	16 (0.45%)	3,234 (91.72%)
Unknown (9; 0.12%)	0	1 (11.11%)	0	8 (88.89%)
Clinical characteristics				
With asthma (856; 11.25%)	63 (7.36%)	44 (5.14%)	5 (0.58%)	744 (86.92%)
Without asthma (6,750; 88.75%)	372 (5.51%)	283 (4.19%)	25 (0.37%)	6,070 (89.93%)
With COPD (342; 4.50%)[b]	21 (6.14%)	26 (7.60%)	1 (0.29%)	294 (85.96%)
Without COPD (7,264; 95.50%)	414 (5.70%)	301 (4.14%)	29 (0.40%)	6,520 (89.76%)
With depression (1,043; 13.71%)[b]	161 (15.44%)	63 (6.04%)	11 (1.05%)	808 (77.47%)
Without depression (6,563; 86.29%)	274 (4.17%)	264 (4.02%)	19 (0.29%)	6,006 (91.51%)
With drug abuse (1,088; 14.30%)[b]	74 (6.80%)	62 (5.70%)	5 (0.46%)	947 (87.04%)
Without drug abuse (6,518; 85.70%)	361 (5.54%)	265 (4.07%)	25 (0.38%)	5,867 (90.01%)
With alcohol abuse (135; 1.77%)[b]	19 (14.07%)	19 (14.07%)	4 (2.96%)	93 (68.89%)
Without alcohol abuse (7,471; 98.23%)	416 (5.57%)	308 (4.12%)	26 (0.35%)	6,721 (89.96%)
With obesity (1,056; 13.88%)	58 (5.49%)	58 (5.49%)	5 (0.47%)	935 (88.54%)
Without obesity (6,550; 86.12%)	377 (5.76%)	269 (4.11%)	25 (0.38%)	5,879 (89.76%)
Access-related factors				
MCO				
WellCare of Kentucky (2,939; 38.64%)	178 (6.06%)	128 (4.36%)	10 (0.34%)	2,623 (89.25%)
Passport Health Plan (1,580; 20.77%)	78 (4.94%)	63 (3.99%)	10 (0.63%)	1,429 (90.44%)
Humana-CareSource (497; 6.53%)	34 (6.84%)	13 (2.62%)	0	450 (90.54%)
Aetna Better Health of Kentucky (2,268; 29.82%)	129 (5.69%)	114 (5.03%)	10 (0.44%)	2,015 (88.84%)
Anthem BCBS Medicaid (322; 4.23%)	16 (4.97%)	9 (2.80%)	0	297 (92.24%)

Smoker Subpopulation (n = 7,606)[a]	Only Pharmaceutical Cessation Benefit Claim (n = 435; 5.72%) # (Row %)	Only Cessation Counseling Benefit Claim (n = 327; 4.30%) # (Row %)	Both Types of Cessation Benefit Claims (n = 30; 0.39%) # (Row %)	Neither Type of Cessation Benefit Claims (n = 6,814; 89.59%) # (Row %)
Insufficient prenatal care (ICD-9 code V23.7, 280 days prior through delivery)[b]				
Yes (1,054; 13.86%)	34 (3.23%)	47 (4.46%)	3 (0.28%)	970 (92.03%)
No (6,552; 86.14%)	401 (6.12%)	280 (4.27%)	27 (0.41%)	5,844 (89.19%)

[a] MMC members who were identified as smokers (i.e., defined by ICD-9 diagnosis code or smoking cessation benefit claim) who delivered a singleton live or non-live birth (excluding induced and spontaneous abortions) during June 1, 2014–May 31, 2015, continuously enrolled from 43 days prior to delivery through 56 days after delivery.

[b] Shows statistically significant association between demographic, clinical or access-related characteristics/factors with receipt of any smoking cessation benefit prior to delivery versus no smoking cessation benefit receipt using *chi*-squared test statistic (*P*-value < 0.05).

COPD: chronic obstructive pulmonary disease; MCO: managed care organization; ICD: International Classification of Diseases.

Multiple Logistic Regression Findings for Receipt of Any Smoking Cessation Benefits for Smokers

Table 3 presents multiple logistic regression results for the associations between receipt of smoking cessation benefits and risk factors (analytic sample excludes members with induced or spontaneous abortions; n = 7,606). Values below or above the neutral 1.000 for the resulting adjusted odds ratio (AOR) for multiple logistic regression analyses indicate lesser or greater odds of receiving smoking cessation benefits, respectively. One group in each category was the referent, meaning the other groups' odds were compared to this group's odds for the same association. For factors without the referent group indicated, the referent group is members without the factor. Confidence intervals (CIs) that do not include the neutral 1.000 value indicate that the associations are statistically significant. Findings for risk factors with statistically significant differences in the odds for receipt of smoking cessation benefits are:

Demographic Characteristics Associated with Receipt of Smoking Cessation Benefit(s)

- Age group: compared to smokers aged 20–34 years,
  - adolescent smokers were less likely to receive smoking cessation benefits (AOR = 0.734; 95% CI = 0.548, 0.983); and
  - smokers aged 35–44 years were more likely to receive smoking cessation benefits (AOR = 1.682; 95% CI = 1.298, 2.179).
- Geographic area of residence: compared to smokers residing in non-Appalachian urban counties,
  - smokers residing in Appalachian counties were more likely to receive smoking cessation benefits (AOR = 1.400; 95% CI = 1.155, 1.696); and
  - smokers residing in non-Appalachian rural counties were more likely to receive smoking cessation benefits (AOR = 2.216; 95% CI = 1.816, 2.705).

Clinical Characteristics Associated with Receipt of Smoking Cessation Benefit(s)

- Alcohol abuse: relative to smokers without a diagnosis of alcohol abuse, smokers with alcohol abuse were more likely to have received smoking cessation benefits (AOR = 3.220; 95% CI = 2.169, 4.781).
- Depression: relative to smokers without a diagnosis of depression, smokers with depression were more likely to have received smoking cessation benefits (AOR = 2.825; 95% CI = 2.369, 3.370).
- Asthma: relative to smokers without a diagnosis of asthma, smokers with asthma were more likely to have received smoking cessation benefits (AOR = 1.294; 95% CI = 1.034, 1.620).
- Drug abuse: relative to smokers without a diagnosis of drug abuse, smokers with drug abuse were more likely to have received smoking cessation benefits (AOR = 1.234; 95% CI = 1.005, 1.516).

Access-Related Factors Associated with Receipt of Smoking Cessation Benefit(s)

- MCO: there were no statistically significant associations between MCO and receipt of smoking cessation benefits.
- Insufficient prenatal care: relative to women without a diagnosis of insufficient prenatal care, women with a diagnosis of insufficient prenatal care were less likely to receive smoking cessation benefits (AOR = 0.697; 95% CI = 0.545, 0.891).

Table 3: Analytic Subsample of Smokers: Multiple Logistic Regression Results for Prenatal Receipt of Smoking Cessation Benefit(s)

Total Smoker Population (n = 7,606)[a]	AOR[b]	95% CI
Demographic characteristics		
Age group		
11–19 years	0.734[c]	(0.548, 0.983)
20–34 years	1.000 (referent)	
35–44 years	1.682[d]	(1.298, 2.179)
45–64 years	1.766	(0.619, 5.036)
Geographic area of residence		
Appalachian	1.400[d]	(1.155, 1.696)
Non-Appalachian – rural	2.216[d]	(1.816, 2.705)
Non-Appalachian – urban	1.000 (referent)	
Unknown	1.787	(0.221, 14.427)
Clinical characteristics		
Asthma	1.294[d]	(1.034, 1.620)
COPD	1.229	(0.883, 1.710)
Depression	2.825[d]	(2.369, 3.370)
Drug abuse	1.234[d]	(1.005, 1.516)
Alcohol abuse	3.220[d]	(2.169, 4.781)
Obesity	1.200	(0.969, 1.486)
Access-related factors		
MCO		
WellCare of Kentucky	1.000 (referent)	
Passport Health Plan	0.954	(0.761, 1.198)
Humana-CareSource	0.918	(0.657, 1.282)
Aetna Better Health of Kentucky	1.072	(0.895, 1.284)
Anthem BCBS Medicaid	0.704	(0.455, 1.089)
Insufficient prenatal care (ICD-9 code V23.7, 280 days prior through delivery)	0.697[d]	(0.545, 0.891)

[a] MMC members who were identified as smokers (i.e., defined by ICD-9 diagnosis code or smoking cessation benefit claim) who delivered a singleton live or non-live birth (excluding induced and spontaneous abortions) during June 1, 2014–May 31, 2015, continuously enrolled from 43 days prior to delivery through 56 days after delivery. Of the 7,606 members included, 792 had some smoking cessation benefit claim, while 6,814 members did not.

[b] Adjusted odds ratio (AOR) was generated using SAS software to conduct multiple logistic regression analysis for the odds of receipt of any smoking cessation benefit, i.e., pharmaceutical or counseling.

[c] Shows significantly decreased odds for receipt of any smoking cessation benefit among those with the characteristic/factor compared to those without the characteristic/factor (referent group).

[d] Shows significantly increased odds for receipt of any smoking cessation benefit prior to delivery among those with the characteristic/factor compared to those without the characteristic/factor (referent group).

CI: confidence interval; COPD: chronic obstructive pulmonary disease; MCO: managed care organization; BCBS: Blue Cross Blue Shield; ICD: International Classification of Diseases.

Perinatal Outcome Rates by Demographic and Clinical Characteristics, and Access-Related Factors

Table 4 presents demographic and clinical characteristics, as well as access-related factors, by perinatal outcome for the administrative analytic sample that includes both smokers and nonsmokers (excludes members with induced or spontaneous abortions; n = 24,391). Two perinatal outcomes were evaluated: preterm delivery and a composite indicator of adverse perinatal outcomes. There were 1,741 (7.14%) members with preterm delivery and 5,984 (24.53%)

members with the composite outcome, i.e., any one of placental abruption, placenta previa, SGA, still birth or preterm delivery. Notable findings are:

Demographic Characteristic Rates for Perinatal Outcomes

- Demographic characteristics were associated with the composite outcome, but not with the preterm delivery outcome.
- Among adolescents aged 11–19 years, 26.17% had the composite outcome, a higher percentage compared to older age groups. Compared to members residing in non-urban areas, a greater proportion of women residing in urban areas had the composite outcome (25.69%).

Clinical Characteristic Rates for Perinatal Outcomes

- Smokers had a higher rate of the composite outcome compared to nonsmokers (29.67% and 22.20%, respectively).
- Members with depression had a higher rate of the composite outcome compared to those without depression (26.70% and 24.33%, respectively).
- Members with drug abuse had a higher rate of the composite outcome compared to those without drug abuse (39.50% and 23.57%, respectively).
- Members with obesity had a lower rate of the composite outcome compared to those without obesity (21.87% and 24.95%, respectively).
- Smokers had a higher rate of preterm delivery compared to nonsmokers (8.74% and 6.41%, respectively).
- Members with depression had a higher rate of preterm delivery compared to members without depression (8.87% and 6.98%, respectively).
- Members with drug abuse had a higher rate of preterm delivery compared to members without drug abuse (11.86% and 6.83%, respectively).

Access-Related Factor Rates for Perinatal Outcomes

- Rates of the composite outcome varied significantly across MCO membership at the time of delivery, ranging from 22.99% to 27.01%.
- Members with a diagnosis of insufficient prenatal care had a higher rate of the composite outcome compared to members without this diagnosis (28.50% and 24.14%, respectively).
- Members with a diagnosis of insufficient prenatal care had a higher rate of preterm delivery compared to members without this diagnosis (10.57% and 6.80%, respectively).

Table 4: Analytic Sample of Smokers and Nonsmokers: Perinatal Outcome Rates

Total Population (n = 24,391)[a]	**Preterm Delivery Outcome (n = 1,741; 7.14%) # (Row %)**	**Perinatal Composite Outcome[b] (n = 5,984; 24.53%) # (Row %)**
Demographic characteristics		
Age group		[c]
11–19 years (3,244; 13.30%)	240 (7.40%)	849 (26.17%)
20–34 years (19,499; 79.94%)	1,378 (7.07%)	4,780 (24.51%)
35–44 years (1,581; 6.48%)	122 (7.72%)	353 (22.33%)
45–64 years (67; 0.27%)	1 (1.49%)	2 (2.99%)
Geographic area of residence		[c]
Appalachian (7,945; 32.57%)	561 (7.06%)	1,928 (24.27%)
Non-Appalachian – rural (4,316; 17.70%)	297 (6.88%)	943 (21.85%)
Non-Appalachian – urban (12,099; 49.60%)	881 (7.28%)	3,108 (25.69%)
Unknown (31; 0.13%)	2 (6.45%)	5 (16.13%)
Clinical characteristics		
Smoker (7,606; 31.18%)	665 (8.74%)[c]	2,257 (29.67%)[c]
Nonsmoker (16,785; 68.82%)	1,076 (6.41%)	3,727 (22.20%)
With depression (2,064; 8.46%)	183 (8.87%)[c]	551 (26.70%)[c]
Without depression (22,327; 91.54%)	1,558 (6.98%)	5,433 (24.33%)

Total Population (n = 24,391)[a]	Preterm Delivery Outcome (n = 1,741; 7.14%) # (Row %)	Perinatal Composite Outcome[b] (n = 5,984; 24.53%) # (Row %)
With drug abuse (1,476; 6.05%)	175 (11.86%)[c]	583 (39.50%)[c]
Without drug abuse (22,915; 93.95%)	1,566 (6.83%)	5,401 (23.57%)
With alcohol abuse (179; 0.73%)	12 (6.70%)	50 (27.93%)
Without alcohol abuse (24,212; 99.27%)	1,729 (7.14%)	5,934 (24.51%)
With obesity (3,265; 13.39%)	232 (7.11%)	714 (21.87%)[c]
Without obesity (21,126; 86.61%)	1,509 (7.14%)	5,270 (24.95%)
Access-related factors		
MCO		[c]
WellCare of Kentucky (8,857; 36.31%)	632 (7.14%)	2,036 (22.99%)
Passport Health Plan (5,550; 22.75%)	382 (6.88%)	1,499 (27.01%)
Humana-CareSource (1,831; 7.51%)	122 (6.66%)	446 (24.36%)
Aetna Better Health of Kentucky (7,026; 28.81%)	533 (7.59%)	1,738 (24.74%)
Anthem BCBS Medicaid (1,127; 4.62%)	72 (6.39%)	265 (23.51%)
Insufficient prenatal care (ICD-9 code V23.7, 280 days prior through delivery)[c]		
Yes (2,214; 9.08%)	234 (10.57%)	631 (28.50%)
No (22,177; 90.92%)	1,507 (6.80%)	5,353 (24.14%)

[a] MMC members who delivered a singleton live or non-live birth (excluding induced and spontaneous abortions) during June 1, 2014–May 31, 2015, continuously enrolled from 43 days prior through 56 days after delivery.
[b] The perinatal composite outcome included any one or more of placental abruption, placenta previa, small-for-gestational age (SGA), still birth or preterm delivery.
[c] Shows a statistically significant association with perinatal outcome based upon *chi*-squared test statistic (*P*-value < 0.05).
MCO: managed care organization; BCBS: Blue Cross Blue Shield; ICD: International Classification of Diseases.

Multiple Logistic Regression Findings for Perinatal Outcomes

Table 5 presents multiple logistic regression results for the associations between preterm delivery outcome or the composite indicator for adverse perinatal outcomes and risk factors. Findings for risk factors with statistically significant differences in the odds for the preterm delivery outcome and for the composite outcome are:

Demographic Characteristics Associated with Perinatal Outcomes

- Age group showed significant associations with the composite outcome, but not with preterm delivery. Compared to women aged 20–34 years, adolescent smokers were more likely to have the composite outcome (AOR = 1.175; 95% CI = 1.078, 1.280), whereas older women were less likely.
- Geographic area of residence showed significant association with the composite outcome, but not with preterm delivery. Compared to women residing in non-Appalachian urban counties, women residing in non-Appalachian rural counties were less likely to have the composite outcome (AOR = 0.819; 95% CI = 0.752, 0.893).

Clinical Characteristics Associated with Perinatal Outcomes

- Smoking: relative to nonsmokers, smokers were more likely to have the composite outcome (AOR = 1.389; 95% CI = 1.302, 1.482) and to deliver preterm (AOR = 1.270; 95% CI = 1.141, 1.413).
- Depression: relative to women without depression, women with depression were more likely to deliver preterm (AOR = 1.203; 95% CI = 1.021, 1.417); however, depression did not show increased odds for the composite outcome.
- Drug abuse: relative to women without drug abuse, women with drug abuse were more likely to deliver preterm (AOR = 1.550; 95% CI = 1.301, 1.847) and to have the composite outcome (AOR = 1.844; 95% CI = 1.646, 2.067).
- Obesity: relative to women without obesity, women with obesity were less likely to have the composite outcome (AOR = 0.825; 95% CI = 0.754, 0.903); however, a significant relationship was not observed with preterm delivery.

Access-Related Factors Associated with Perinatal Outcomes

- MCO: compared to the referent MCO (WellCare of Kentucky), two MCOs (Passport Health Plan and Aetna Better Health of Kentucky) showed higher odds for the composite outcome, with AORs ranging from 1.111 (95% CI = 1.031, 1.196) to 1.252 (95% CI = 1.152, 1.362); however, MCO membership was not associated with preterm delivery.
- Insufficient prenatal care: relative to women without a diagnosis of insufficient prenatal care, women with a diagnosis of insufficient prenatal care were more likely to deliver preterm (AOR = 1.473; 95% CI = 1.269, 1.710); however, insufficient prenatal care was not associated with the composite outcome.

Table 5: Analytic Sample of Smokers and Nonsmokers: Multiple Logistic Regression Results for Perinatal Outcomes

Total Population (n = 24,391)[a]	Preterm Delivery Outcome[a] AOR[c] (95% CI)	Perinatal Composite Outcome[a,b] AOR[c] (95% CI)
Demographic characteristics		
Age group		
11–19 years	1.109 (0.960, 1.281)	1.175 (1.078, 1.280)[d]
20–34 years	1.000 (referent)	1.000 (referent)
35–44 years	1.101 (0.907, 1.337)	0.882 (0.779, 0.999)[e]
45–64 years	0.207 (0.029, 1.491)	0.097 (0.024, 0.397)[e]
Geographic area of residence		
Appalachian	0.942 (0.836, 1.062)	0.941 (0.876, 1.011)
Non-Appalachian – rural	0.929 (0.807, 1.069)	0.819 (0.752, 0.893)[e]
Non-Appalachian – urban	1.000 (referent)	1.000 (referent)
Unknown	0.841 (0.199, 3.548)	0.544 (0.207, 1.429)
Clinical characteristics		
Smoker	1.270 (1.141, 1.413)[d]	1.389 (1.302, 1.482)[d]
Depression	1.203 (1.021, 1.417)[d]	1.034 (0.931, 1.148)
Drug abuse	1.550 (1.301, 1.847)[d]	1.844 (1.646, 2.067)[d]
Alcohol abuse	0.680 (0.375, 1.233)	0.874 (0.625, 1.222)
Obesity	0.990 (0.856, 1.145)	0.825 (0.754, 0.903)[e]
Access-related factors		
MCO		
WellCare of Kentucky	1.000 (referent)	1.000 (referent)
Passport Health Plan	0.942 (0.818, 1.085)	1.252 (1.152, 1.362)[d]
Humana-CareSource	0.921 (0.752, 1.130)	1.097 (0.972, 1.236)
Aetna Better Health of Kentucky	1.066 (0.945, 1.202)	1.111 (1.031, 1.196)[d]
Anthem BCBS Medicaid	0.908 (0.705, 1.169)	1.065 (0.919, 1.234)
Insufficient prenatal care (ICD-9 code V23.7, 280 days prior through delivery)	1.473 (1.269, 1.710)[d]	1.080 (0.977, 1.194)

[a] MMC members who delivered a singleton live or non-live birth (excluding induced and spontaneous abortions) during June 1, 2014-May 31, 2015, continuously enrolled from 43 days prior through 56 days after delivery. Of the 24,391 members in this analysis, 1,741 members had a preterm delivery outcome and 22,650 members did not, while 5,984 members had the composite outcome and 18,407 did not.

[b] The perinatal composite outcome included any one or more of placental abruption, placenta previa, small-for-gestational age (SGA), still birth or preterm delivery.

[c] Adjusted odds ratio (AOR) generated using SAS software to conduct multiple logistic regression analysis.

[d] Shows significantly increased odds for the outcome among those with the risk factor compared to those without the risk factor (referent group).

[e] Shows significantly decreased odds for the outcome among those with the risk factor compared to those without the risk factor (referent group).

CI: confidence interval; MCO: managed care organization; BCBS: Blue Cross Blue Shield; ICD: International Classification of Diseases.

Chart Review Findings

Coding practices for smoking status and smoking cessation interventions for pregnant women among Kentucky MMC providers are not known. In addition, MCO care management (CM) identification of pregnant smokers and care coordination for cessation services cannot be determined from administrative data. Therefore, a review of perinatal provider medical records for a sample of pregnant women in Kentucky MMC and any corresponding MCO CM records was conducted.

Chart Disposition

There were a total of 500 members for whom prenatal care provider, postpartum care provider and MCO CM charts were requested, based upon a random member sample stratified by MCO (n = 100) and by ICD-9–defined smokers (n = 50) and nonsmokers (n = 50; **Table 6**). There were a total of 424 members for whom at least one of the three chart types was received, but only 108 members had all three types of charts submitted (prenatal care provider, postpartum care provider and MCO CM charts). The number of prenatal care provider charts received that were valid for review was 349, the number of postpartum care provider charts received that were valid for review was 137, and the number of MCO CM charts received was 230.

The denominator of 230 CM charts included any CM submitted by the MCO that contained documentation for that member. Some of the submitted CM charts had very limited documentation, including statements such as "hospital delivery record received" or some type of notation by the CM such as "member not eligible for CM," without evidence of outreach to the member.

Prenatal care provider medical records for the members in the sample were reviewed to evaluate provider prenatal and postpartum identification of maternal smokers and interventions implemented to facilitate smoking cessation.

Prenatal care provider adherence to guidelines for assessment and management of maternal smokers, including the ACOG 5-A recommendations for smoking cessation during pregnancy, were assessed using the sample for which a prenatal care provider record was received (n = 349; **Table 6**). A prenatal record was considered valid for review if at least one prenatal visit, as defined by HEDIS specifications[1], was documented in the medical record during the review period. Trimester of prenatal visit was calculated based upon the estimated date of delivery abstracted from the chart.

[1]HEDIS specifications for prenatal care visit to an obstetrician/gynecologist or PCP with diagnosis of pregnancy: medical record must include the date and *one* of the following: (1) a basic physical obstetrical exam that includes auscultation for fetal heart tone, *or* pelvic exam with obstetric observations, *or* measurement of fundus height; (2) evidence a prenatal care procedure was performed: screening test in the form of an obstetric panel, *or* TORCH antibody panel alone, *or* a rubella antibody test/titer with an Rh incompatibility (ABO/Rh) blood typing, *or* echography of a pregnant uterus; (3) documentation of LMP or EDD in conjunction with *either* prenatal risk assessment and counseling/education *or* complete obstetrical history.

Table 6: Chart Disposition

MCO	Charts Requested	Valid Charts Received							Charts Excluded	Prenatal Chart Retrieval Rate[f]	Total Member Chart Retrieval Rate[f]
		Prenatal	Postpartum[a]	Case Management[b]	All Three	Prenatal Study Sample[c]	Prenatal Study Reported Subset[d]	Final Study Sample[e]			
Anthem BCBS Medicaid	100	71	30	63	28	71	67	90	0	71%	90%
Aetna Better Health of Kentucky[g]	100	59	20	37	9	58	55	72	1[h]	59%	72%
Humana-CareSource	100	75	31	11	8	75	69	79	0	75%	79%
Passport Health Plan	100	88	29	85	48	88	84	95	0	88%	95%
WellCare of Kentucky	100	79	27	34	15	79	74	88	0	79%	88%
Total	**500**	**372**	**137**	**230**	**108**	**371**	**349**	**424**	**1**	**74%**	**85%**

[a] Postpartum excludes 221 provider records submitted for the postpartum care provider record request that were submitted without documentation of a postpartum assessment (n = 91) or visit (n = 130).
[b] This sample includes all MCO records with member specific documentation, including records documenting that member was not eligible for CM, and therefore with no outreach documented.
[c] Prenatal study sample includes members for whom at least a prenatal chart was received.
[d] Prenatal reported subset includes prenatal study sample (for whom at least a prenatal chart was received) and excluding those members with spontaneous abortion or ectopic pregnancy as documented in the chart.
[e] Final sample includes members for whom at least one of the three charts was received.
[f] Chart retrieval rate = number of valid charts received / (number of charts requested – number of charts excluded).
[g] Aetna Better Health of Kentucky operated as CoventryCares of Kentucky when the data were requested/submitted.
[h] Exclusion for one prenatal medical record received because only an ultrasound was provided for member.
MCO: managed care organization; BCBS: Blue Cross Blue Shield.

Characteristics of the Chart Review Sample

Table 7 presents characteristics of the chart review sample, with findings summarized as follows:

- Among the entire chart review sample, there were 172 members (40.57%) identified as smokers by chart review; however, 216 members (50.94%) were identified as smokers by administrative data using ICD-9 diagnosis and claims for smoking cessation benefits.
- Women aged 20–34 years comprised the majority of the chart review sample (84.20%).
- White women comprised most of the sample (42.92%), followed by the "other" race/ethnicity category (32.78%), black/non-Hispanic (7.78%) and race/ethnicity "not provided" (6.13%).

Table 7: Chart Review Sample Characteristics

Total Charts Received (n = 424)	Smoker Based on Chart[a] (n = 172; 40.57%) # (Column %)	Nonsmoker Based on Chart[a] (n = 252; 59.43%) # (Column %)
Smoker based on administrative analysis[b] (n = 216; 50.94%)	148 (86.05%)	68 (26.98%)
Age group		
11–19 years (n = 45; 10.61%)	11 (6.40%)	34 (13.49%)
20–34 years (n = 357; 84.20%)	154 (89.53%)	203 (80.56%)
35–44 years (n = 22; 5.19%)	7 (4.07%)	15 (5.95%)
Race/Ethnicity[c]		
American Indian or Alaskan Native (n = 1; 0.24%)	1 (0.58%)	0
Asian or Pacific Islander (n = 3; 0.71%)	1 (0.58%)	2 (0.79%)
Black/Non-Hispanic (n = 33; 7.78%)	10 (5.81%)	23 (9.13%)
Black/Not otherwise specified (n = 5; 1.18%)	1 (0.58%)	4 (1.59%)
White/Non-Hispanic (n = 182; 42.92%)	86 (50.00%)	96 (38.10%)
White/Not otherwise specified (n = 30; 7.08%)	13 (7.56%)	17 (6.75%)
Hispanic (n = 3; 0.71%)	1 (0.58%)	2 (0.79%)
Bi-racial (n = 2; 0.47%)	1 (0.58%)	1 (0.40%)
Other (n = 139; 32.78%)	51 (29.65%)	88 (34.92%)
Not provided (n = 26; 6.13%)	7 (4.07%)	19 (7.54%)

[a] Members were documented as a prenatal smoker by prenatal care provider or, if no prenatal chart was received but a case management chart was received, then members were documented as prenatal smokers by the case manager. If no documentation of smoking status in either, then administrative data was used to identify smoking status.

[b] Members were identified as smokers in the administrative analysis if there was an ICD-9 diagnosis code for any encounter during the 280 days prior to delivery or if there was a pharmacy claim or counseling claim for smoking cessation benefit during the 280 days prior to delivery; however, the sample selection was based upon ICD-9 diagnosis code, only, with 50 smokers and 50 nonsmokers randomly selected from each MCO.

[c] Race/Ethnicity was abstracted from the prenatal care provider chart, but if not documented, then race/ethnicity was obtained from the administrative database.

Table 8 presents prenatal chart review findings overall and for the subset that excludes members with diagnoses indicative of gestation periods less than 20 weeks, e.g., either spontaneous abortion or ectopic pregnancy, as determined from chart review. Findings for the sample that excludes women with spontaneous abortions or ectopic pregnancy are as follows:

- Most members' first prenatal visit occurred during the first trimester (199/349 = 57.02%).
- The majority of members were assessed for smoking status during a prenatal visit (89.97%); however, only 49.28% had an initial smoking assessment conducted at a first prenatal visit that occurred during the first trimester.
- Only 6.88% of pregnant members were assessed for secondhand smoke exposure by the prenatal care provider.
- Less than half (46.98%) of prenatal smokers were advised to quit at any prenatal visit, 22.15% were advised to quit during the first trimester and 16.11% during the second trimester.
- Only 2.01% of prenatal smokers were referred to the Kentucky quit line.

The pregnant former-smoker subsample was comprised of 30 members.

- Eight of thirty (26.67%) of pregnant former smokers had their smoking status monitored at one or more prenatal follow-up visits.

Table 8: Prenatal Chart Review – Provider Adherence to Recommendations for Smoking Cessation During Pregnancy

Adherence to Recommendations[a]	Prenatal Charts Received[b] (n = 349) N/D (% Column)
Timing of first prenatal visit	
1st trimester	199/349 (57.02%)
2nd trimester	100/349 (28.65%)
3rd trimester	50/349 (14.33%)
Did the provider ASK about smoking status during the prenatal period?	
No smoking assessment conducted at any prenatal visit	35/349 (10.03%)
Yes, initial smoking assessment conducted at any prenatal visit	314/349 (89.97%)
Initial smoking assessment conducted at:	
First prenatal visit	288/349 (82.52%)
First prenatal visit: 1st trimester	172/349 (49.28%)
First prenatal visit: 2nd trimester	84/349 (24.07%)
First prenatal visit: 3rd trimester	32/349 (9.17%)
Any subsequent visit	26/349 (7.45%)
Subsequent visit: 1st trimester	0
Subsequent visit: 2nd trimester	12/349 (3.44%)
Subsequent visit: 3rd trimester	14/349 (4.01%)
Did the provider ASK about secondhand smoke exposure during the prenatal period?	
Any prenatal assessment of secondhand smoke exposure	24/349 (6.88%)
Members with secondhand smoke exposure among those assessed for secondhand smoke exposure	17/24 (70.83%)
Smoker subsample	149
Did the provider ADVISE the member to quit smoking during the prenatal period?	
Advised to quit at any prenatal visit	70/149 (46.98%)
Provider first advised member to quit smoking:	
1st trimester	33/149 (22.15%)
2nd trimester	24/149 (16.11%)
3rd trimester	8/149 (5.37%)
Undetermined trimester	5/149 (3.36%)
Did not advise member to quit at any prenatal visit	79/149 (53.02%)
Did the provider ASSESS the member's willingness to quit smoking during the prenatal period?	
Provider did not assess willingness to quit at any prenatal visit	129/149 (86.58%)
Provider did assess willingness to quit at any prenatal visit	20/149 (13.42%)
Member had a plan to quit within 30 days	1/20 (5.00%)
Member had a plan to quit, but no plans for next 30 days	1/20 (5.00%)
Member did not have a plan to quit	18/20 (90.00%)
Did the provider ASSIST with or ARRANGE for any prenatal smoking cessation interventions?	
No prenatal smoking cessation provider interventions	60/149 (40.27%)
Yes, provider arranged for or assisted with any smoking cessation intervention	89/149 (59.73%)
Any specific smoking cessation interventions arranged for member by provider	60/149 (40.27%)

Adherence to Recommendations[a]	Prenatal Charts Received[b] (n = 349) N/D (% Column)
Specific smoking cessation interventions arranged:	
Referral to Kentucky quit line	3/149 (2.01%)
Perinatal provider counseling[c]	57/149 (38.26%)
Counseling session with health educator	3/149 (2.01%)
Referral to other cessation program	1/149 (0.67%)
Pharmacotherapy	0
Refer to PCP	0
Any general smoking cessation assistance by provider	43/149 (28.86%)
General smoking cessation assistance:	
Encourage member to talk about process for quitting	43/149 (28.86%)
Support, e.g., discussed importance of quitting "buddy"	1/149 (0.67%)
Self-help, e.g., brochure	0
Smoking status monitored at 1+ follow-up prenatal visit	59/149 (39.60%)
Smoking status monitored at 1+ follow-up telephone call during prenatal period	0
Former-smoker subsample	30
Smoking status monitored at 1+ follow-up prenatal visit	8/30 (26.67%)

[a] ACOG (2010) recommendations, sometimes referred to as "the 5 A's," for smoking cessation during pregnancy, were adapted for data abstraction, and included the following key elements: (1) Ask about smoking status at the first prenatal visit; (2) Advise smoking cessation by providing clear, strong and personalized messages; (3) Assess the patient's willingness to attempt smoking cessation within the next 30 days; (4) Arrange specific smoking cessation interventions; (5) Assist patients who express an interest in quitting by providing general smoking cessation support/guidance.

[b] This table reports prenatal care provider chart review findings for the chart review sample with a prenatal care provider chart, excluding women with a spontaneous abortion or ectopic pregnancy (n = 22). The intent was to report for the subset with a more comparable prenatal period because women with a spontaneous abortion or ectopic pregnancy would have had less opportunity for prenatal visits due to the shortened prenatal period, e.g., delivery prior to 20 weeks gestation.

[c] This was the only intervention arranged by the provider received by members with successful smoking abstinence during the prenatal period through delivery.

N: numerator; D: denominator; PCP: primary care provider.

Table 9 presents specific prenatal care provider interventions and smoking abstinence outcomes among the subset of members who received prenatal care provider counseling and who did not have the outcomes of either spontaneous abortion or ectopic pregnancy. Findings for this analysis are as follows:

- There were 57 of 149 members (38.26%) who received prenatal care provider counseling.
  - Of these 57 members, medical record documentation indicated that a total of 5 members quit smoking during pregnancy; 2 quit smoking with abstinence from the first trimester through delivery, 1 abstained from the second trimester through delivery, and 2 abstained from the third trimester through delivery.
  - More than half (31/57; 54.39%) of these members had at least one follow-up visit that addressed smoking status and 22.81% were encouraged by the provider to talk about the process of quitting.
  - Advice regarding the risks to the fetus was received by 17.54% of these 57 members, and 8.77% received advice regarding the risks to the newborn.

Table 9: Prenatal Care Provider Interventions and Smoking Abstinence Outcomes

Provider Advice, Follow-up Received	N/D (% Smokers with Counseling)[a]	Achieved Smoking Abstinence Through Delivery by Trimester of Initiation[b]		
		1st trimester	2nd trimester	3rd trimester
Received prenatal care provider counseling	57/57 (100%)[c]	2[d]	1[e]	2[f]
Received the following provider advice or follow-up				
Provider follow-up visit	31/57 (54.39%)[g]	0	1	2
Provider encouraged member to talk about the process of quitting	13/57 (22.81%)	0	1	1
Advice regarding risks to fetus	10/57 (17.54%)	0	0	0
Advice regarding risks to newborn	5/57 (8.77%)	0	0	0
Advice regarding risks to mother	2/57 (3.51%)	0	0	0
Referral to Kentucky quit line	3/57 (5.26%)	0	0	0
Counseling by a health educator	1/57 (1.75%)	0	0	0
Support[h]	1/57 (1.75%)	0	0	0
Discussed roadblock of being around other smokers	1/57 (1.75%)	0	0	0
None of the above	2/57 (3.51%)	2	0	0

[a] Restricted to subsample without spontaneous abortion or ectopic pregnancy.
[b] There were 57 members (38.26%) among the 149 smokers who received prenatal care provider counseling for smoking cessation. Of these 57 members, 5 members (8.77%) achieved smoking abstinence during the prenatal period. None of the remaining interventions (i.e., smoking cessation counseling by a health educator, smoking cessation medication, referral to Kentucky quit line, referral to other smoking cessation program, referral to other provider, referral to primary care provider) were received by members with reported smoking abstinence through delivery.
[c] One member did not quit during prenatal period, but did quit prior to first postpartum visit.
[d] Both members quit when they learned that they were pregnant and did receive counseling during the 1st trimester; 1 member relapsed during postpartum.
[e] Member received counseling during the 1st and 2nd trimesters; had no postpartum record.
[f] Both members received counseling during the 2nd trimester, and one also received counseling in the 3rd trimester; neither had any postpartum records.
[g] This includes member who quit prior to first postpartum visit. Counting this member, there were three members reporting at the first postpartum visit that they quit smoking postpartum. An additional member who quit prior to the postpartum visit received follow-up prenatal care but not perinatal provider counseling for smoking cessation. A third member also quit smoking prior to the first postpartum visit, but had no prenatal chart. These three members are categorized as former smokers in the postpartum chart analysis presented in **Table 10**.
[h] Examples of support: importance of smoke-free spaces at home and seeking out a "quitting buddy."
N: numerator; D: denominator.

Table 10 presents findings from the subsample with a postpartum chart. Of the total 228 postpartum records received, 91 (39.91%) did not have a smoking assessment documented by the provider. A total of 137 (60.09%) postpartum records (including 4 members without a prenatal chart) were considered valid for review of provider smoking interventions as they had at least one postpartum visit, as defined by HEDIS[2], and included a provider smoking assessment documented in the review period.

- Most members (126/137; 92.07%) were asked about smoking status by their provider at their first postpartum visit; 11 members had a smoking assessment at a subsequent postpartum visit. A lesser percentage (20.44%) had secondhand smoke exposure assessed at a postpartum visit.

[2] HEDIS specifications for postpartum visit to an obstetrician/gynecologist practitioner or midwife, family practitioner or other PCP on or between 21 and 56 days after delivery: medical record must include the date and *one* of the following: (1) pelvic exam; (2) evaluation of weight, blood pressure, breasts and abdomen; and/or (3) notation of postpartum care, including, but not limited to notation of "postpartum care," "PP care," "PP check," "6-week check," *or* a preprinted "postpartum care" form in which information was documented during the visit

- A total of 31.39% (43/137) reported smoking the same amount as prior to or during pregnancy.
- Three members reported to the postpartum care provider that they quit postpartum, but there was no documentation that the provider congratulated or otherwise reinforced smoking cessation.
- Slightly more than one third (15/43, 34.88%) had smoking status monitored at one or more visits following the initial postpartum visit.

Among the postpartum smokers subsample (n = 43; **Table 10**), the following findings apply to the postpartum period:

- There were no postpartum smoking cessation provider interventions for the majority of the postpartum smoker subset (83.72%).
- Five (11.63%) postpartum smokers were encouraged to talk about the process for quitting.
- Only four postpartum smokers (9.30%) were asked whether they had a plan to quit, and only one had a plan to quit.
- Five postpartum smokers were advised to quit, and three members (6.98%) received other smoking cessation counseling at the postpartum visit.
- None of the postpartum smokers were referred to the Kentucky quit line.
- Among the 15 members with smoking assessed at a follow-up postpartum visit (and therefore, an opportunity for the postpartum provider to have documented smoking abstinence), there were no members who reported quitting.

There were 27 members in the postpartum subsample of members who were identified as former smokers. Former smokers include 3 members whose smoking status was assessed by the postpartum provider as having quit postpartum, as well as 24 members identified by the prenatal provider as former smokers (**Table 10**).

- Three (11.11%) of the 27 former smokers had their smoking status monitored at one or more postpartum follow-up visits.

Table 10: Postpartum Chart Review – Provider Adherence to Recommendations for Smoking Cessation During Pregnancy

Adherence to Recommendations[a,b]	N/D (%)
Total postpartum charts received	228/228 (100.00%)
Postpartum charts without a documented smoking assessment	91/228 (39.91%)
Postpartum charts received with smoking assessment	137/228 (60.09%)[c]
Postpartum care provider asked about smoking status at first postpartum visit	126/137 (92.07%)
Postpartum care provider asked about smoking status at a visit subsequent to first postpartum visit	11/137 (8.0%)
Postpartum care provider asked about exposure to secondhand smoke	28/137 (20.44%)
Members with secondhand smoke exposure	7/28 (25.00%)
Members who reported at postpartum visit that they quit smoking postpartum	3/137 (2.19%)
Members who reported quitting postpartum who were congratulated by provider	0
Members who reported at postpartum visit that they are smoking the same amount as before	43/137 (31.39%)[d]
Prenatal smokers with both a prenatal and postpartum chart and who reported at postpartum visit that they are smoking the same amount as before	36/53 (67.92%)[e]
Postpartum smokers subsample	43/137 (31.39%)
Provider asked if member had plan to quit	4/43 (9.30%)
Member had a plan to quit	1/4 (25%)
Provider advised the member to quit	5/43 (11.63%)
Members who quit smoking postpartum subsequent to provider smoking assessment	0
No postpartum smoking cessation provider interventions	36/43 (83.72%)
Any specific postpartum smoking cessation interventions arranged for member by provider	3/43 (6.98%)
Specific postpartum smoking cessation interventions arranged:	
Referral to Kentucky quit line	0
Perinatal provider counseling	3/43 (6.98%)
Counseling session with health educator	0
Referral to other cessation program	0
Pharmacotherapy	0
Refer to PCP	0

Adherence to Recommendations[a,b]	N/D (%)
Any general postpartum smoking cessation assistance by provider	6/43 (13.95%)
General postpartum smoking cessation assistance:	
Encourage member to talk about process for quitting	5/43 (11.63%)
Support[f]	1/43 (2.33%)
Self-help, e.g., brochure	0
Smoking status monitored at 1+ follow-up postpartum visit	15/43 (34.88%)
Smoking status monitored at 1+ follow-up telephone call during postpartum period	0
Members who reported quitting smoking at a follow-up postpartum visit or telephone call	0
Former-smoker subsample[g]	27
Smoking status monitored at 1+ follow-up postpartum visit	3/27 (11.11%)

[a] ACOG (2010) recommendations, sometimes referred to as "the 5 A's," for smoking cessation during pregnancy, were adapted for data abstraction, and included the following key elements: (1) Ask about smoking status at the first prenatal visit; (2) Advise smoking cessation by providing clear, strong and personalized messages; (3) Assess the patient's willingness to attempt smoking cessation within the next 30 days; (4) Arrange specific smoking cessation interventions; (5) Assist patients who express an interest in quitting by providing general smoking cessation support/guidance.
[b] One smoker with spontaneous abortion is included in this table.
[c] This numerator included four members without a prenatal chart.
[d] Of the 137 members with documentation of a postpartum smoking assessment, 43 reported smoking the same amount as before.
[e] A total of 53 prenatal smokers had both a prenatal and a postpartum chart with a documented smoking assessment Of these 53 members, 36 reported at a postpartum visit that they smoke the same amount as before.
[f] Examples of support: importance of smoke-free spaces at home and seeking out a "quitting buddy."
[g] Former smokers include 3 members whose smoking status was assessed by the postpartum care provider as having quit postpartum, as well as 24 members identified by the prenatal care provider as former smokers.
N: numerator; D: denominator; PCP: primary care provider.

Tables 11, **12**, **13** and **14** present findings abstracted from MCO CM records (n = 230). Key findings are highlighted below for smokers and nonsmokers, combined.

- About half (53.04%) of members with a CM record were asked about their smoking status. Only 3.48% were assessed for secondhand smoke exposure (**Table 11**).
- Adolescents comprised 10% of the MCO CM chart review sample (**Table 11**). Of the 5 adolescent smokers, none were engaged with CM for smoking cessation and 1 received care coordination for smoking cessation (data not shown).
- Women with asthma comprised almost 10% of the MCO CM chart review sample (9.57%; **Table 11**). Of the 8 women with asthma who were smokers, none were engaged with CM for smoking cessation and 3 received care coordination for smoking cessation (data not shown).
- Women with a diagnosis of drug abuse comprised 8.26% of the MCO CM chart review sample (**Table 11**). Of the 13 women with drug abuse who were smokers, none were engaged with CM for smoking cessation and 4 received care coordination for smoking cessation (data not shown).
- Women with a diagnosis of depression comprised 7.83% of the MCO CM chart review sample (**Table 11**). Of the 10 women with depression who were smokers, none were engaged with CM for smoking cessation and 3 received care coordination for smoking cessation (data not shown).
- About 17% of members did not receive CM outreach (**Table 12**). Corresponding MCO-specific rates for lack of any CM outreach ranged from 0% to 35.14% (**Table 13**).
- MCO-specific smoking assessment rates ranged from 32.43% to 82.54% (**Table 13**).
- Only 9.57% were outreached for any purpose during the first trimester, 29.57% were outreached during the second trimester and 30.43% were outreached during the third trimester (**Table 12**).
- Only 5.65% were outreached for any purpose during the delivery hospitalization, whereas 38.26% were outreached during the postpartum period (**Table 12**).

Table 11: MCO CM Chart Review – Identification of Smokers by CM Staff and Provider

Smoker Identification	n (%)
MCO charts received	230 (100.00%)
Age group	
11–19 years	23 (10%)
20–34 years	198 (86.09%)
35–44 years	9 (3.91%)
Health conditions	
Asthma	22 (9.57%)
COPD (excluding asthma)	5 (2.17%)
Depression	18 (7.83%)
Drug abuse	19 (8.26%)
Alcohol abuse	2 (0.87%)
CM staff asked about smoking status	122 (53.04%)
Members identified by CM staff as current smokers[a]	48 (20.87%)
Current smokers as identified by provider[b]	96 (41.74%)
CM staff asked about exposure to secondhand smoke	8 (3.48%)
Members identified by CM staff with secondhand smoke exposure	1 (0.43%)
Members identified by provider with secondhand smoke exposure	12 (5.22%)

[a] Members identified by care management (CM) staff as smoking during current pregnancy. This includes four members identified as smokers by the CM staff, but as never- or former-smokers by the provider.

[b] Members identified by prenatal care provider as smoker, as well as members without a prenatal chart who were identified by CM as smoker, as in **Table 7**, restricted to managed care organization (MCO) chart subsample. This does not include the four members identified as either never- or former-smokers by the provider, but who were identified as smokers by the CM staff.

Of the 230 members with MCO CM records, 48 members were identified as smokers by care managers (CM-identified smokers), whereas 96 were identified as smokers by the prenatal care provider (provider-identified smokers; **Table 11**). The results for CM- and provider-identified smokers are presented in **Table 12** and key findings are as follows:

- Among CM-identified smokers, 22.92% were outreached for any purpose during the first trimester. However, among the provider-identified smokers, the corresponding percentage was 15.63%.
- Among CM-identified smokers, 45.83% were outreached for any purpose during the second trimester. However, among the provider-identified smokers, the corresponding percentage was 36.46%.
- Among CM-identified smokers, 39.58% were outreached for any purpose during the third trimester. However, among the provider-identified smokers, the corresponding percentage was 26.04%.
- Among CM-identified smokers, 31.25% were outreached for any purpose during the postpartum period, with a comparable proportion (34.38%) of provider-identified smokers outreached postpartum.
- Among the provider-identified smokers, 14.58% received no CM outreach.

Table 12: MCO CM Chart Review – Perinatal CM Outreach, Contact, Engagement and Interventions

CM Outreach, Contact, Engagement and Interventions: Smoker Subsamples[a]	MCO Chart Subsample (n = 230)	CM-Identified Smoker Subsample[b] (n = 48)	Provider-Identified Smoker Subsample[c] (n = 96)
Any CM outreach			
Prenatal – 1st trimester	22 (9.57%)	11 (22.92%)	15 (15.63%)
Prenatal – 2nd trimester	68 (29.57%)	22 (45.83%)	35 (36.46%)
Prenatal – 3rd trimester	70 (30.43%)	19 (39.58%)	25 (26.04%)
Prenatal – unable to determine trimester	9 (3.91%)	1 (2.08%)	3 (3.13%)
Delivery hospitalization	13 (5.65%)	2 (4.17%)	6 (6.25%)
Postpartum	88 (38.26%)	15 (31.25%)	33 (34.38%)
No CM outreach	39 (16.96%)	0	14 (14.58%)
CM staff contacted member regarding smoking cessation		25 (52.08%)	24 (25.00%)
Prenatal – 1st trimester		4 (8.33%)	4 (4.17%)
Prenatal – 2nd trimester		11 (22.92%)	10 (10.42%)
Prenatal – 3rd trimester		10 (20.83%)	7 (7.29%)
Prenatal – unable to determine trimester		0	0
Delivery hospitalization		1 (2.08%)	1 (1.04%)
Postpartum		6 (12.50%)	6 (6.25%)
No CM outreach		23 (47.92%)	72 (75.00%)
CM staff engaged member regarding smoking cessation		3 (6.25%)	1 (1.04%)
Prenatal – 1st trimester		1 (2.08%)	1 (1.04%)
Prenatal – 2nd trimester		1 (2.08%)	0
Prenatal – 3rd trimester		1 (2.08%)	0
Prenatal – unable to determine trimester		0	0
Delivery hospitalization		0	0
Postpartum		0	0
No CM outreach		45 (93.75%)	95 (98.96%)
No CM engagement, but care coordination was offered[d]		18 (37.50%)	17 (17.71%)
No CM engagement and no care coordination was offered[e]		27 (56.25%)	78 (81.25%)
CM staff notified provider of member's smoking status		0	0
CM staff coordinated smoking cessation interventions with provider		0	0
CM facilitated referrals to the Kentucky quit line during the prenatal period		8 (16.67%)	8 (8.33%)
1st trimester		2 (4.17%)	2 (2.08%)
2nd trimester		5 (10.42%)	5 (5.21%)
3rd trimester		1 (2.08%)	1 (1.04%)
CM staff facilitated referrals to smoking cessation counseling provider during the prenatal period		4 (8.33%)	4 (4.17%)
1st trimester		1 (2.08%)	1 (1.04%)
2nd trimester		2 (4.17%)	2 (2.08%)
3rd trimester		1 (2.08%)	1 (1.04%)
Any CM-facilitated referral regarding smoking cessation during the prenatal period		10 (20.83%)	10 (10.42%)
Any CM-facilitated referral regarding smoking cessation during delivery		4 (8.33%)	4 (4.17%)
Any CM-facilitated referral regarding smoking cessation during the		0	0

CM Outreach, Contact, Engagement and Interventions: Smoker Subsamples[a]	MCO Chart Subsample (n = 230)	CM-Identified Smoker Subsample[b] (n = 48)	Provider-Identified Smoker Subsample[c] (n = 96)
postpartum period			
Smoking cessation services received by the member (as documented in MCO chart)		4 (8.33%)	4 (4.17%)
Kentucky quit line services received		2 (4.17%)	2 (2.08%)
Counseling provider services received		2 (4.17%)	2 (2.08%)
CM staff documented that member initiated a quit attempt		0	0
Prenatal care provider chart documented successful quit attempt		2 (4.17%)	2 (2.08%)

[a] Five members with spontaneous abortion, including one smoker, are included in this table.
[b] Members identified by care management (CM) staff as smoking during current pregnancy. This includes four members identified as smokers by the CM staff, but as never- or former-smokers by the provider.
[c] Members identified by prenatal care provider as smoker, as well as members without a prenatal chart who were identified by CM as smoker, as in **Table 7**, restricted to managed care organization (MCO) chart subsample. This does not include the four members identified as either never- or former-smokers by the provider, but who were identified as smokers by the CM staff.
[d] Member refused care coordination for smoking cessation; or there was documentation of a discussion of cessation options without documentation of member agreeing to cessation services; or there was documentation of coordination of referrals for smoking cessation without member's documented consent.
[e] Neither CM coordination nor engagement for smoking cessation was documented.

Key findings regarding CM member contact, engagement and care coordination for smoking cessation are as follows:

- Among CM-identified smokers, about half (52.08%) were contacted by the care manager and smoking cessation was discussed. However, only one-fourth of provider-identified smokers were contacted by the care manager regarding smoking cessation (**Table 12**).
- MCO-specific rates ranged from 0% to 100% (4/4), and contact volumes ranged as high as 13 members (**Table 14**).
- Only four smokers were contacted by the care manager and smoking cessation discussed during the first trimester. This represents 8.33% of CM-identified smokers and 4.17% of provider-identified smokers (**Table 12**).
- Among CM-identified smokers, 22.92% were contacted and smoking cessation discussed during the second trimester and about one-fifth (20.83%) during the third trimester. Corresponding percentages among provider-identified smokers were 10.42% and 7.29%, respectively (**Table 12**).
- Among CM-identified smokers, 93.75% were not engaged in CM for smoking cessation (documentation that member agreed to CM smoking cessation services or documented receipt of smoking cessation services). The corresponding proportion among provider-identified smokers was 98.96% (**Table 12**).
- Among the CM-identified smokers not engaged in CM for smoking cessation, 37.50% were offered care coordination for smoking cessation , but there was no documentation that member was engaged in smoking cessation services. However, the corresponding proportion among provider-identified smokers was 17.71% (**Table 12**). Corresponding MCO-specific rates ranged from 16.67% to 75.00% (**Table 14**).
- None of the members' providers were contacted by CM staff to either provide notification of the member's smoking status or to coordinate smoking cessation interventions with the provider (**Table 12**).

Table 13: MCO CM Chart Review – Perinatal CM Outreach by MCO

CM Outreach	MCO				
	WellCare of Kentucky N/D (%)	Passport Health Plan N/D (%)	Humana-CareSource N/D (%)	Aetna Better Health of Kentucky N/D (%)	Anthem BCBS Medicaid N/D (%)
MCO CM charts (n = 230)	34/230 (14.78%)	85/230 (36.96%)	11/230 (4.78%)	37/230 (16.09%)	63/230 (27.39%)
CM staff asked about smoking status	18/34 (52.94%)	36/85 (42.35%)	4/11 (36.36%)	12/37 (32.43%)	52/63 (82.54%)
Any CM outreach, not limited to smoking cessation	31/34 (91.18%)	67/85 (78.82%)	11/11 (100%)	24/37 (64.86%)	58/63 (92.06%)
Prenatal – 1st trimester	5/34 (14.71%)	2/85 (2.35%)	0	2/37 (5.41%)	13/63 (20.63%)
Prenatal – 2nd trimester	8/34 (23.53%)	23/85 (27.06%)	4/11 (36.36%)	6/37 (16.22%)	27/63 (42.86%)
Prenatal – 3rd trimester	5/34 (14.71%)	30/85 (35.29%)	1/11 (9.09%)	13/37 (35.14%)	21/63 (33.33%)
Prenatal – unable to determine trimester	2/34 (5.88%)	4/85 (4.71%)	1/11 (9.09%)	1/37 (2.70%)	1/63 (1.59%)
Delivery hospitalization	0	7/85 (8.24%)	4/11 (36.36%)	1/37 (2.70%)	1/63 (1.59%)
Postpartum	14/34 (41.18%)	46/85 (54.12%)	7/11 (63.64%)	15/37 (40.54%)	6/63 (9.52%)
No CM outreach of any kind	3/34 (8.82%)	18/85 (21.18%)	0	13/37 (35.14%)	5/63 (7.94%)

CM: care management; MCO: managed care organization; BCBS: Blue Cross Blue Shield; N: numerator; D: denominator.

Key findings regarding CM-facilitated referrals for smoking cessation are as follows:

- CM staff facilitated 10 referrals regarding smoking cessation during the prenatal period; this represents 20.83% of CM-identified smokers, but only 10.42% of provider-identified smokers (**Table 12**).
- CM staff facilitated referrals to the Kentucky quit line during the prenatal period for 8 of 48 (16.67%) CM-identified smokers and 8 of 96 (8.33%) of the provider-identified smokers (**Table 12**). Most of these referrals (7/8; 87.50%) were attributable to one MCO (Anthem BCBS Medicaid; **Table 14**).
- Only two referrals to the Kentucky quit line were made during the first trimester, with most (five) made during the second trimester (**Table 12**).
- Only two members had documentation reflecting receipt of smoking cessation services from the Kentucky quit line (**Table 12**).
- CM staff facilitated four referrals to a smoking cessation counseling provider during the prenatal period, with only one referral made during the first trimester (**Table 12**).
- Only two members received services from the smoking cessation counseling provider (**Table 12**).
- No CM-identified smokers had documentation of a quit attempt, although there were two members in CM who had provider-documented successful quit attempts (**Table 12**).
- None of the CM- or provider-identified smokers had CM documentation of postpartum CM smoking cessation services or coordination (**Table 12**).

Table 14: MCO Chart Review of CM-Identified Prenatal Smokers – CM Contact, Engagement and Interventions by MCO

CM Contact, Engagement and Interventions: CM-Identified Prenatal Smokers (n = 48)	WellCare of Kentucky (n = 8)	Passport Health Plan (n = 12)	Humana-CareSource (n = 2)	Aetna Better Health of Kentucky (n = 4)	Anthem BCBS Medicaid (n = 22)
CM contact with member regarding smoking cessation – any time during perinatal period	5 (62.50%)	3 (25.00%)	0	4 (100.00%)	13 (59.09%)
CM 1st trimester contact with member regarding smoking cessation	0	0	0	2 (50.00%)	2 (9.09%)
Any CM prenatal contact with member regarding smoking cessation	4 (50.00%)	2 (16.67%)	0	4 (100.00%)	13 (59.09%)
CM postpartum contact with member regarding smoking cessation	2 (25.00%)	2 (16.67%)	0	1 (25.00%)	1 (4.55%)
CM contact with prenatal care provider regarding smoking cessation	0	1 (8.33%)	0	0	2 (9.09%)
CM contact with postpartum care provider regarding smoking cessation	0	0	0	0	0
CM coordination with provider for smoking cessation interventions	0	0	0	0	0
Member engagement with CM regarding prenatal smoking cessation	0	1 (8.33%)	0	1 (25.00%)	1 (4.55%)
No CM engagement, but care coordination was offered	3 (37.50%)	2 (16.67%)	1 (50%)	3 (75.00%)	9 (40.91%)
CM referred member to Kentucky quit line	0	0	0	1 (25.00%)[a]	7 (31.82%)[b]
CM referred member to smoking cessation counselor	1 (12.5%)[a]	0	0	1 (25.00%)[c]	2 (9.09%)[d]
CM referred member to other smoking cessation service/program	3 (37.50%)[e]	1 (8.33%)[a,f]	0	2 (50.00%)[a,g]	2 (9.09%)[d,h]
Prenatal care provider documented smoking cessation success	0	1 (8.33%)[d]	0	0	0
Postpartum care provider documented smoking cessation success	0	0	0	0	0

[a] Third trimester.
[b] Two in the first trimester and five in the second trimester.
[c] First trimester.
[d] Second trimester.
[e] Two in the second trimester and one in the third trimester. Included: referral to CM for smoking, smoking cessation resources, and smoking packet provided.
[f] Included: secondhand smoke information.
[g] Included: Krames literature on smoking during pregnancy and "not specified."
[h] Included: referral to smokefree.gov.
CM: care management; BCBS: Blue Cross Blue Shield.

Discussion

Administrative data provide evidence to suggest that prenatal smoking prevalence among Kentucky MMC women is higher than previously reported, yet smoking cessation claims data indicate benefit underutilization among this susceptible subpopulation. Smoking during pregnancy is a major factor in preterm birth and other adverse birth outcomes (ACOG, 2010). Smoking prevalence among Kentucky MMC enrollees with a delivery code during June 1, 2014–May 31, 2015, as identified by either ICD-9 codes for smoking or smoking cessation benefit claims prior to and/or including delivery, was 30.8%; a higher rate than previously reported based upon ICD-9 codes only (20.3%; IPRO/KDMS, 2014) and vital records (22.9%; KDPH, 2013). Smoking was highly prevalent among women with alcohol or substance abuse, and smoking was more prevalent among women with asthma/COPD or depression when compared to women without these diagnoses. Although most (46.95%) smokers resided in urban areas, the geographic subgroups with the greatest proportion of smokers were the Appalachian (33.22%) and rural (31.59%) subgroups. The American Lung Association (ALA) has identified a culture of tobacco use as a root cause of tobacco use and a challenge to smoking cessation in Appalachian and rural areas (ALA, 2012). These high risk subgroups among which smoking is prevalent could be targeted by MCOs for identification of smoking and cessation intervention.

The vast majority of smokers (89.32%) had no claims for smoking cessation benefits. Thus, there is substantial opportunity for improving member utilization of prenatal, as well as preconception, smoking cessation benefits. Younger maternal smokers, particularly those aged 11–19 years, had lower rates of cessation services than smokers in other age groups; this finding is consistent with national findings (Nugent et al., 2014). Lack of access to sufficient prenatal care and primary care were also risk factors for lack of receipt of smoking cessation benefits. This high-risk subgroup would benefit from targeted intervention. Interestingly, members with alcohol and substance abuse had higher rates of receipt of cessation benefits compared to members without these diagnoses.

Consistent with findings from the National Health Interview Survey (Nugent et al., 2014), healthier smokers were less likely to have received smoking cessation interventions; though there is ample room for improvement in this area for both groups, since most members in both groups received no cessation benefits. This finding suggests there may be increased access to providers among sicker smokers, resulting in increased interventions for smoking cessation. Urban residence was also a risk factor for lack of receipt of smoking cessation benefits, and merits further exploration by the MCOs. Chart review findings indicate that member receipt of smoking assessment and timely cessation interventions was lacking from both providers and MCO care management. Risk factors for lack of receipt of smoking cessation benefits included younger age (adolescents and women younger than 35 years).

Asking pregnant women about smoking status and offering pregnancy-tailored cessation counseling are level A recommendations from the USPSTF, signifying a high certainty of substantial benefit from these interventions (USPSTF 2009). The majority of members were assessed for smoking status during a visit to their prenatal care provider, with about half assessed during the first trimester. Less than half of smokers' records had documentation of advice to quit by the prenatal care provider, and 59.73% of the prenatal smoking subsample had any documented smoking cessation interventions. The most prevalent specific prenatal provider intervention documented was perinatal provider counseling (38.26%), yet only 2.01% of pregnant smokers were referred to the Kentucky quit line. General assistive-type interventions, such as encouraging the member to talk about the process of quitting (28.86%), also indicate opportunities for improvement. Only 39.60% of pregnant smokers had their smoking status monitored at a follow-up visit, although there is evidence that smoking cessation at any time during pregnancy is of benefit (ACOG, 2010).

MCO care managers identified only half of all pregnant smokers who were identified by the prenatal care provider and had an MCO care management record. One-fourth of members who were identified as smokers by the prenatal care provider were contacted by the MCO care coordinator for smoking cessation and only four members were contacted during the first trimester. Consequently, there was considerable missed opportunities for MCO care managers to have potential impact on adverse fetal outcomes by facilitating smoking cessation, since cessation at any time during pregnancy has been found to reduce the risk for preterm delivery (Moore et al., 2016) and fetal growth restriction (Blatt et al., 2015).

The vast majority of prenatal smokers were not engaged with CM for smoking cessation, and there was no care coordination with the prenatal care provider for smoking cessation. Coordination with prenatal care providers may have allowed the MCO to continue support for the two members who providers identified as abstinent to prevent relapse. MCO care managers referred just eight members to the Kentucky quit line; most of these referrals were attributable to one MCO, and only two were documented to have received these services.

Study Limitations and Strengths

The administrative study was limited by unmeasured factors that could have influenced the relationship between the possible risk factor and the outcome, as in any observational study. For example, teen mothers may have lower rates of cessation benefits due to late presentation for care, which could not be reliably measured with claims data. Further, the current study was not designed to be a validation study. Therefore, the use of ICD-9 codes and smoking cessation benefit claims codes to identify smokers was not validated against chart review findings, and coding practices among Kentucky MMC providers are not known. For example, ICD-9 codes identified as smokers 16 of 34 women identified by prenatal care providers as former smokers, and so ICD-9 codes may not be a reliable way to identify current smokers. Former smokers who quit would not have the same need for intervention as current smokers. Another limitation was that race/ethnicity was either not reported or reported as "other" for a substantial proportion of the sample; therefore precluding meaningful analysis of this demographic factor.

Chart review study limitations include the possibility that the services were undocumented, rather than not rendered. The sample was chosen, in part, by identifying a cohort of maternal smokers by ICD-9 codes, and therefore results may not be generalizable to the Kentucky MMC perinatal population. For example, since a diagnostic code was submitted for smoking status for half of the sample, it could be assumed that smoking status was assessed for this cohort. Another limitation is the variability in MCO response rates for prenatal care provider chart provision, which ranged from 58% to 88%, postpartum care provider chart provision, which ranged from 20% to 31%, and MCO CM chart provision, which ranged from 11% to 85%. Further, provision of postpartum charts was low across MCOs.

Chart review study strengths include sufficient sample size to determine the statistically significant findings among the groups analyzed, i.e., ≥ 30 charts. In addition, the focus of this study was on prenatal smoking, and the prenatal care provider chart submission rate was high at 74%.

Conclusion

Prenatal smoking is prevalent among the Kentucky MMC population, and there are subgroups with higher risk for smoking and lack of services that could be targeted for intervention. Members with comorbidities, i.e., alcohol abuse, depression and COPD, were more likely to receive smoking cessation benefits, whereas teen mothers and members with insufficient prenatal care were less likely. Many prenatal smokers enrolled in Kentucky MMC did not receive ACOG-recommended smoking cessation interventions from providers. With few exceptions, neither prenatal care providers nor MCO care managers referred prenatal smokers to the Kentucky quit line. What's more, there were considerable missed opportunities for care managers to identify, contact and engage prenatal smokers in smoking cessation programs early in the pregnancy, as well as missed opportunities to contact prenatal care providers for coordination of smoking cessation interventions. Consequently, only a handful of pregnant smokers achieved smoking abstinence during the critical prenatal period.

Recommendations

KDMS can provide guidance to the plans by initiating a statewide collaborative performance improvement project (PIP) for prenatal smoking cessation and by working with the plans to address prenatal access and availability issues, in accordance with the specific MCO recommendations outlined below.

Kentucky Medicaid MCOs can address the problems and risk factors identified in this focused study by identifying and sharing current gaps and best practices, as well as collaborating with providers for quality improvements by drawing on the following recommendations:

- target and tailor care coordination/case management to susceptible subpopulations as indicated by risk factors identified in this report;
- conduct a collaborative PIP to improve preconception/prenatal smoker identification, contact, engagement, coordination and referral for smoking cessation;
- build on existing efforts with the CMS smoking affinity group to refine the focus on prenatal smoking cessation and to address known challenges, such as lack of Kentucky quit line data on MMC pregnant smokers who have contacted the quit line; and
- work with obstetricians and gynecologists to improve preconception and prenatal identification of smokers and to coordinate prenatal smoking cessation services. Specifically:
    - develop and implement a Notice of Pregnancy form for provider use to inform MCO CM of pregnant women who smoke;

- develop an MCO smoker registry to identify all members who smoke;
- develop a high-risk obstetric CM program that targets the smoking subpopulation for smoking cessation and ongoing support of identified smokers;
- develop provider-based listings of smokers to distribute to providers with information on smoking cessation benefits, the Kentucky quit line and how to refer members for smoking cessation services; and
- encourage, educate and facilitate provider implementation of the ACOG recommendations for smoking cessation during pregnancy, including augmented, pregnancy-tailored counseling and the 5 A's.

Findings from this focused study reinforce the importance of IPRO's recommendation in the Access and Availability Survey (IPRO/KDMS, 2015) that MCOs increase obstetrician/gynecologist contact and appointment rates in order to improve access to appropriate prenatal care.

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